February 8: Bertram Kostant (MIT), "Center of $U(\mathfrak{n})$, cascade of orthogonal roots, and a construction of Wolf-Lipsman."

Let G be a complex simply-connected semisimple Lie group and let $\mathfrak{g} = \operatorname{Lie} G$. Let $\mathfrak{g} = \mathfrak{n}_- + \mathfrak{h} + \mathfrak{n}$ be a triangular decomposition of $\mathfrak{g}$. One readily has that $\operatorname{Cent} U(\mathfrak{n})$ is isomorphic to the ring $S(\mathfrak{n})^{\mathfrak{n}}$ of symmetric invariants. Using the cascade $\mathcal{B}$ of strongly orthogonal roots, some time ago we proved (see [K]) that $S(\mathfrak{n})^{\mathfrak{n}}$ is a polynomial ring $\mathbb{C}[\xi_1, \ldots, \xi_m]$ where m is the cardinality of $\mathcal{B}$. The authors in [LW] introduce a very nice representation-theoretic method for the construction of certain elements in $S(\mathfrak{n})^{\mathfrak{n}}$. A key lemma in [LW] is incorrect but the idea is in fact valid. Here we modify the construction so as to yield these elements in $S(\mathfrak{n})^{\mathfrak{n}}$ and use the [LW] result to prove a theorem of Tony Joseph.

[**K**] Bertram Kostant, "The cascade of orthogonal roots and the coadjoint structure of the nilradical of a Borel subgroup of a semisimple Lie group." Paper in honor of I. M. Gelfand, to appear in *Moscow Mathematical Journal*, Spring 2012.

[**LW**] Ronald Lipsman and Joseph Wolf, "Canonical semi-invariants and the Plancherel formula for parabolic groups," *Trans. Amer. Math. Soc.* **269** (1982), 111–131.